Diploma Course in Condensed Matter Physics 2013-14

Mathematical Techniques - {10 Lectures = 15 hours}

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Contents

Grading and Exams:

Homework: Problem sheets every week.
From second week on: Hand in your solution by the evening of Wednesday 2 days before the tutorial. The homework will be graded and discussed in the tutorials. The performance in the homework contributes to the final grade.

Intermediate written exam: Somewhere at the beginning of November.
Contributes 33% to the final grade.
Final exam at the end of December – contributes 67% to the final grade.

Recommended textbooks

K. Huang: *Statistical Mechanics,* John Wiley & Sons, New York, 1987
General, good, especially for kinetics, hydrodynamics, Ising model

L. Landau & I. Lifshitz: *Statistical Physics (Vol. 5)*, Pergamon Press
General, logical structure

F. Reif: *Fundamentals of statistical and thermal physics,* McGraw-Hill Book Company New York, 1965
General, thorough

A. Sommerfeld: *Thermodynamics and Statistical Mechanics*, Academic press, New York, 1956.
Good for traditional thermodynamics

Advanced texts:

N. Goldenfeld: *Lectures on Phase transitions and the Renormalization Group,* Frontiers in Physics, Addison Wesley, Reading Massachusetts, 1994:
Phase transitions, RG

P. Chaikin and T. Lubensky, *Principles of Condensed Matter Physics,* Cambridge University Press, 1995
Phase transitions, rich on applications to condensed matter

L. Landau & I. Lifshitz: *Statistical Physics II (Vol. 9)*, Pergamon Press
Modern Theory of quantum gases and liquids, magnetic systems

R. P. Feynman: *Statistical Mechanics – A set of lectures*, Frontiers in Physics, Benjamin/Cummings, Reading Massachusetts, 1982
Path integrals, chosen subjects in statistical mechanics